

Wool

Science Explorers

Exploring the science
of everyday materials

Nicola Edwards and
Jane Harris





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Nicola Edwards and
Jane Harris

Photographs by
Julian Cornish-Trestrail



Look at
these things
we've collected.

They
are all made
from wool.



A young girl with brown hair, wearing a yellow t-shirt and blue denim overalls, is sitting cross-legged on a white surface. She is smiling and holding a red coloring pen in her right hand. Around her are various wool products: a large roll of yellow wool, a red wool blanket, a blue wool blanket, a yellow wool blanket, and several balls of wool in blue, yellow, and red. There are also several coloring pens and a small pile of wool fabric. A speech bubble from the top right says, "Even the tip of my colouring pen is made from wool." The entire scene is framed by a purple border.

Most wool comes from sheep.
It's the sheep's springy coat.



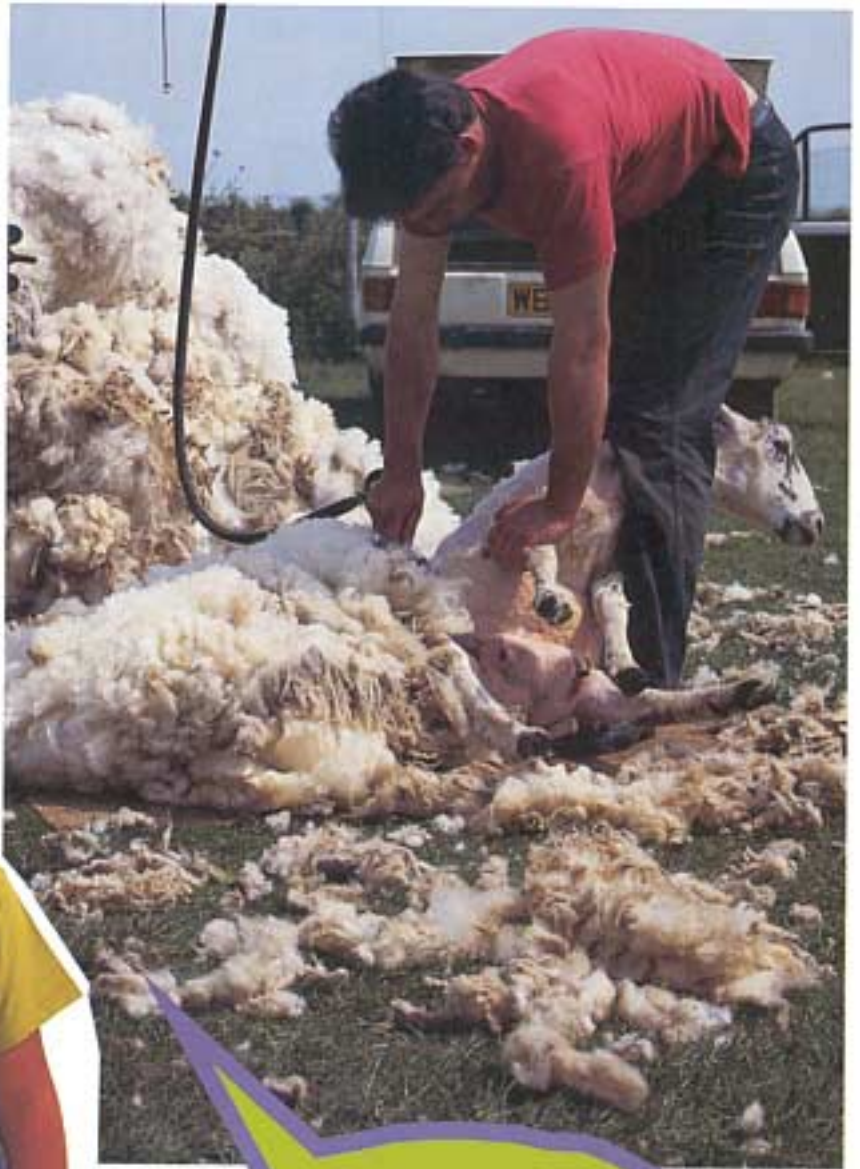
This is
raw wool. It's
a bit greasy.

We're looking at some sheep's wool
through a magnifying glass.



Can you
see lots of
curly hairs?

Sheep are shorn once a year. Their wool coats are washed and dried, then combed to remove the tangles.



Don't worry,
it doesn't hurt!



This wool has been dyed blue.
A machine is twisting it into
long pieces of thread.



Look at all these balls of wool. They have been dyed different colours and some threads are thicker than others.

A photograph of a young girl and a young boy sitting together, surrounded by several balls of wool in various colors (black, red, yellow, pink, blue). The girl, on the left, is wearing a yellow shirt and blue overalls, and is looking down at a black ball of wool. The boy, on the right, is wearing a red and orange striped shirt and is looking at a yellow ball of wool. The background is a solid purple color.

I'm choosing a dark-coloured ball.

I'm choosing a light-coloured ball.



Wool is woven
into clothes
in factories.

You can also knit
your own clothes
with knitting
needles.

I'm helping my mum
to knit a scarf!

I feel cold, so
I'm putting on a
woollen jumper.

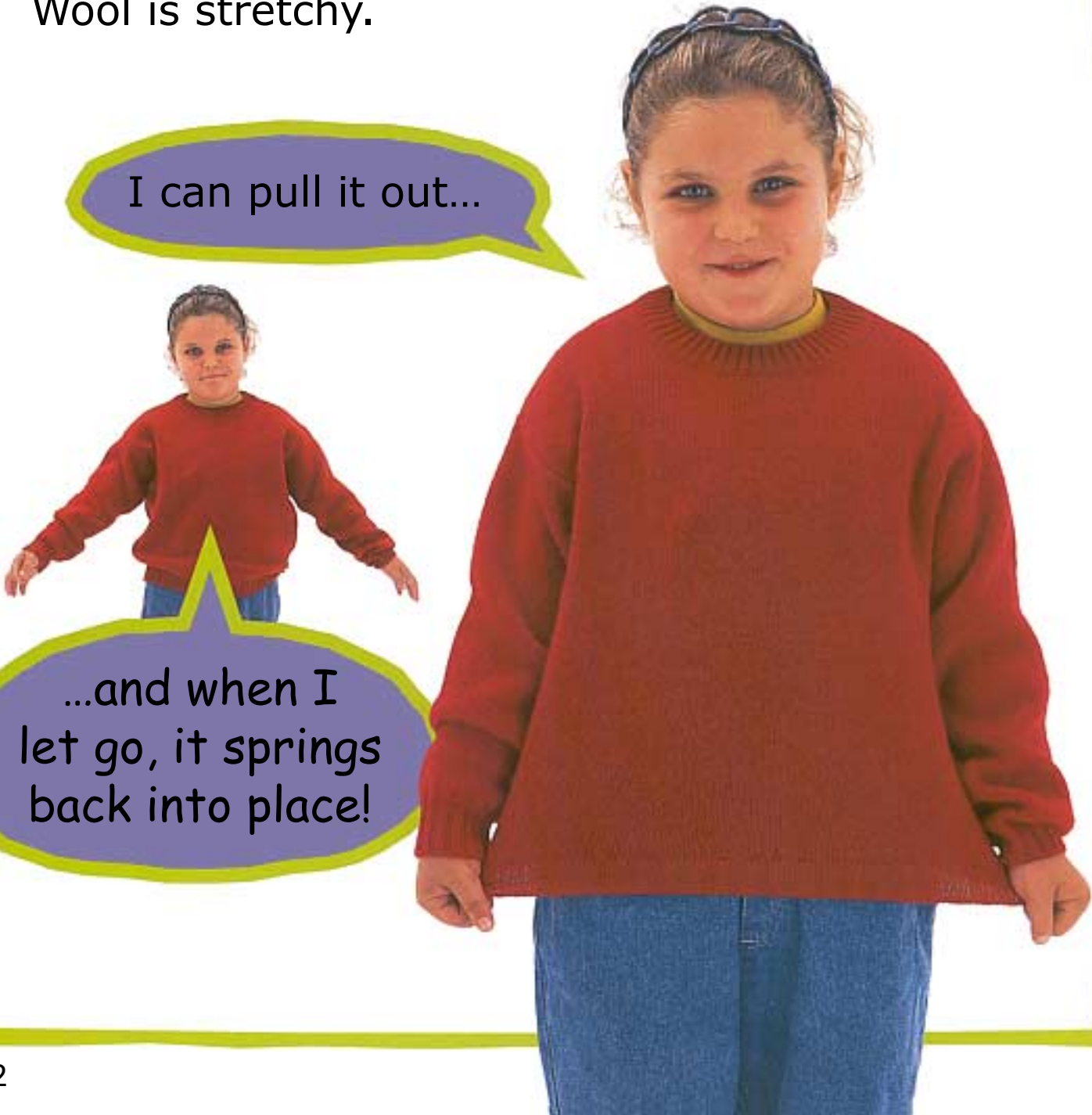
It feels a bit
rough on my skin.



My scarf is
softer than
the jumper.

It feels warm
and smooth.

Wool is stretchy.



I can pull it out...

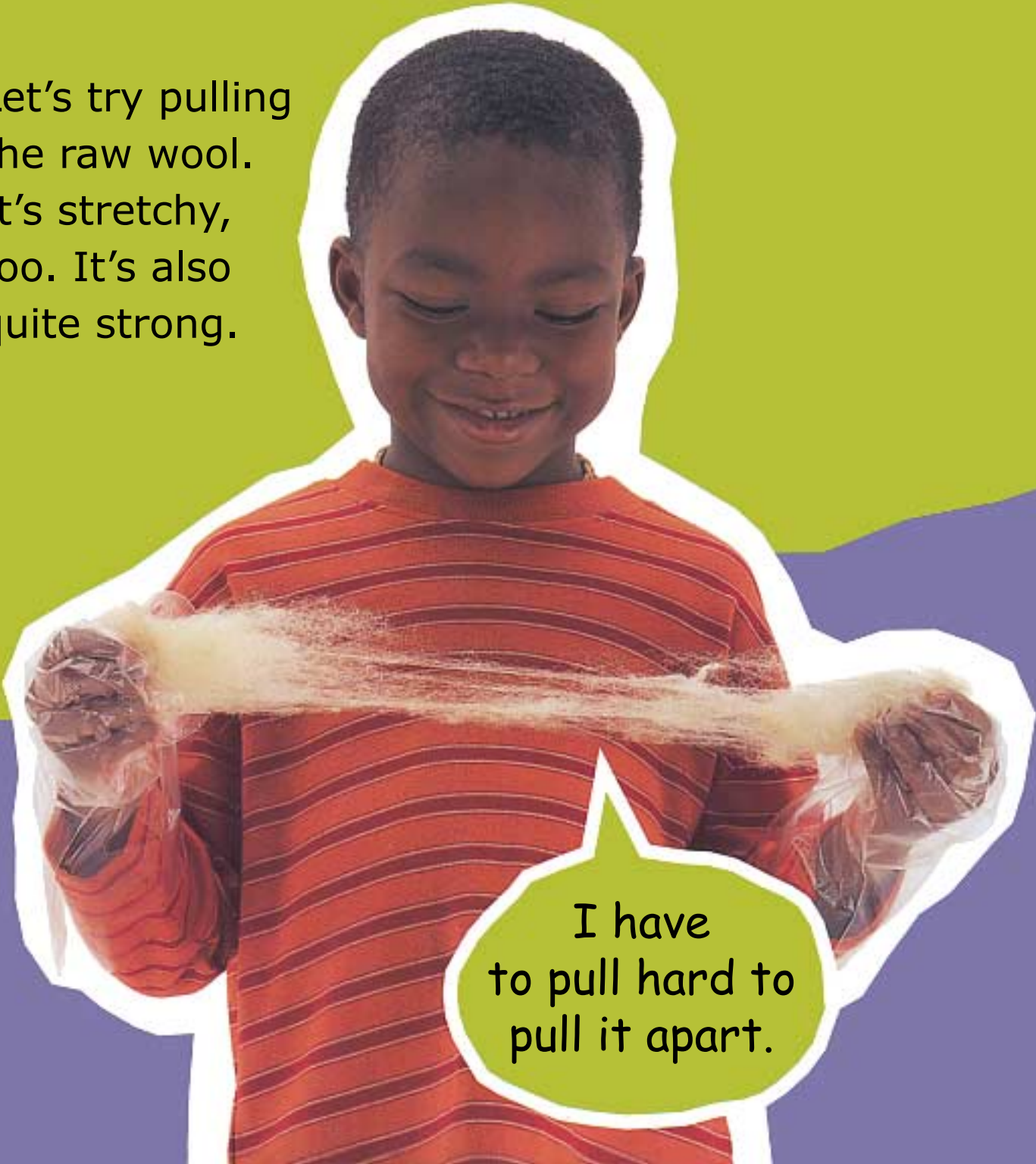
...and when I
let go, it springs
back into place!

A close-up photograph of a red knitted jumper. A hand is holding a magnifying glass with a yellow handle and a pink frame over the fabric. The magnifying glass is positioned to show the texture of the wool threads more clearly. The background is a solid white color.

I'm stretching
my jumper and
looking at
it closely.

I can see
all the threads
of wool.

Let's try pulling
the raw wool.
It's stretchy,
too. It's also
quite strong.



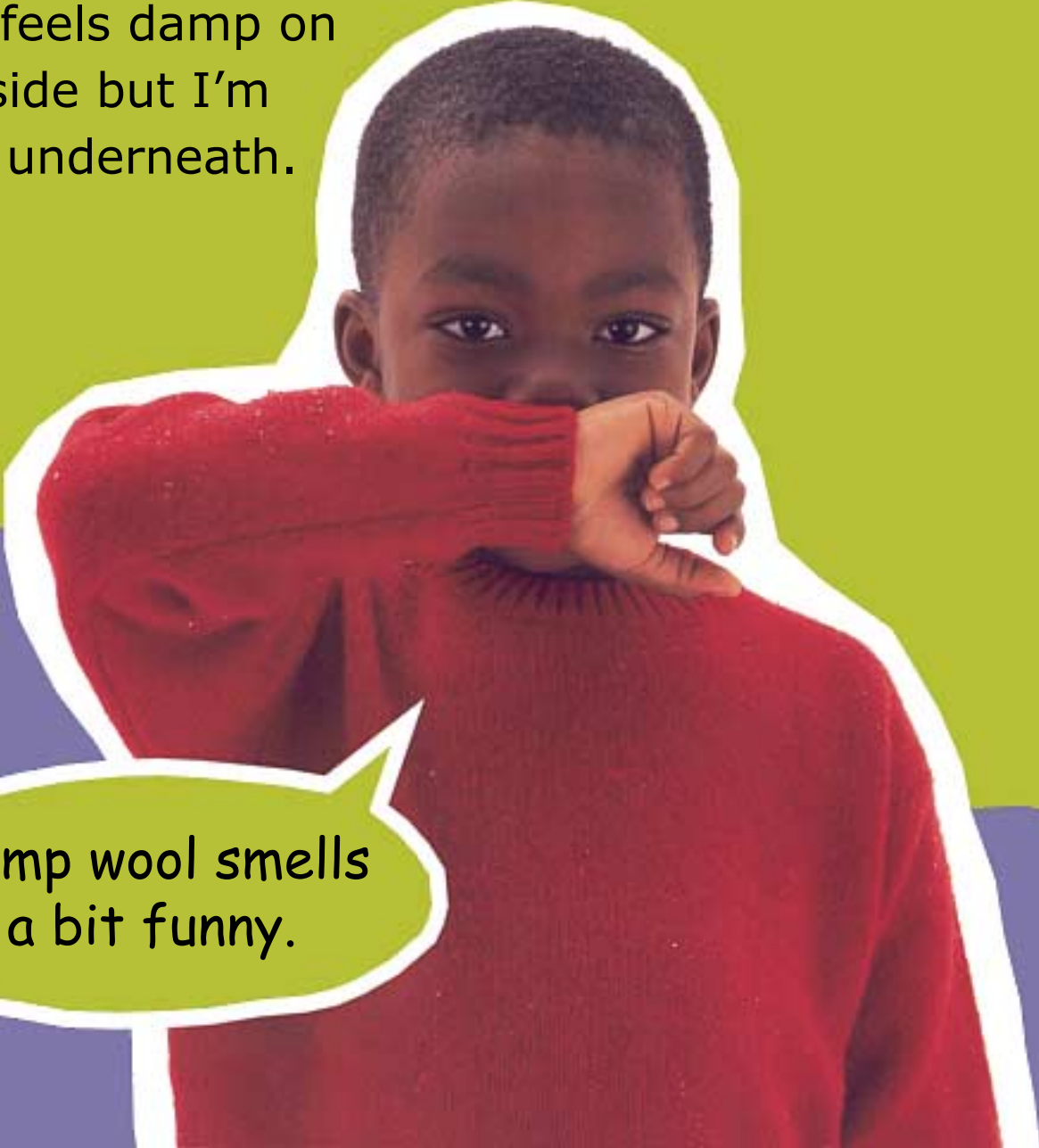
I have
to pull hard to
pull it apart.

Woollen clothes keep us warm.
The tiny hairs in the wool
help stop the heat
escaping from
our bodies.



I feel really snug
and warm.

We've just been outside
in the rain. My woollen
jumper feels damp on
the outside but I'm
still dry underneath.



Damp wool smells
a bit funny.

My T-shirt is not
made from wool.
The rain has
soaked through.

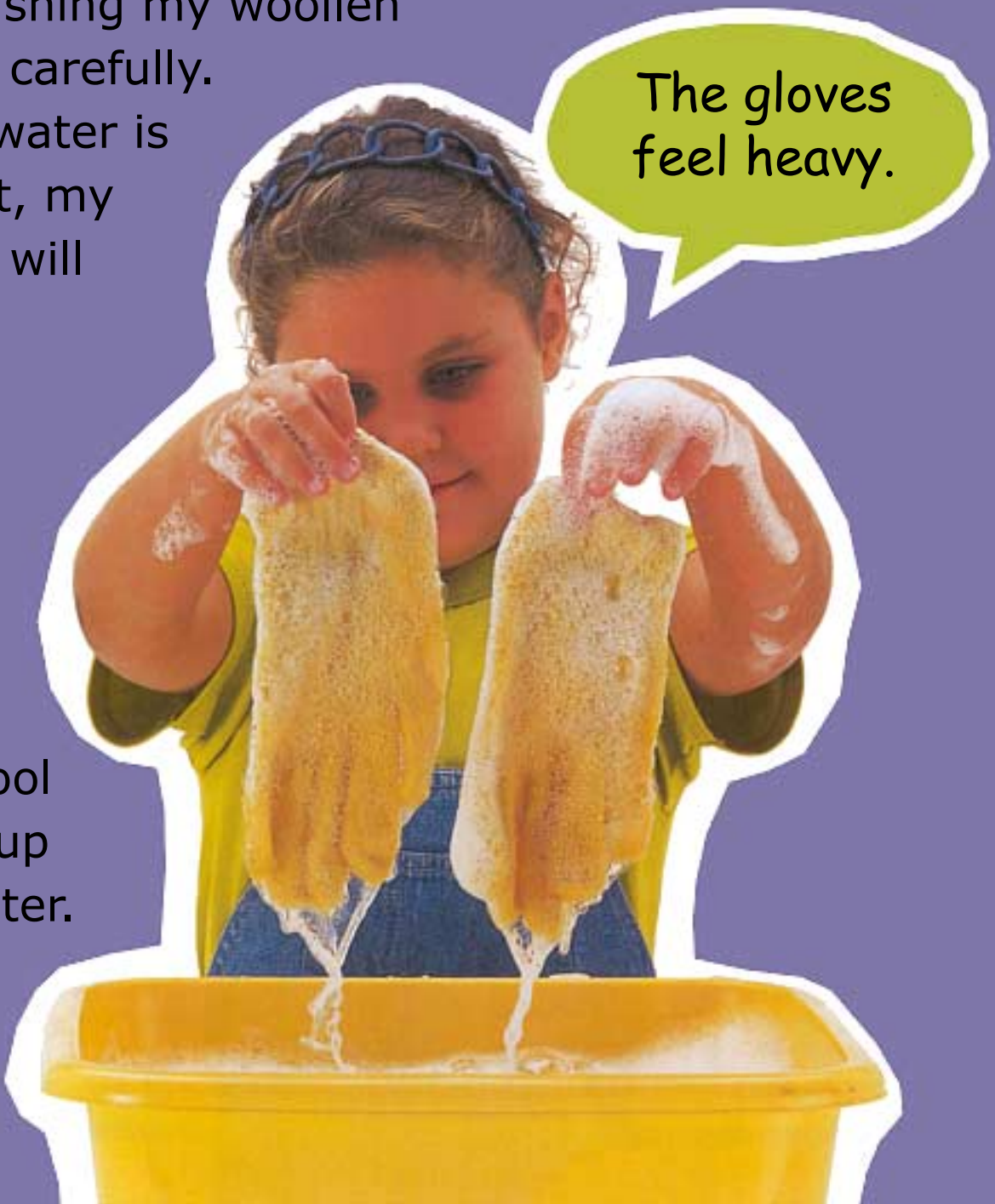


Yuk! I feel
cold and wet.

I'm washing my woollen gloves carefully.
If the water is too hot, my gloves will shrink!

The gloves feel heavy.

The wool soaks up the water.



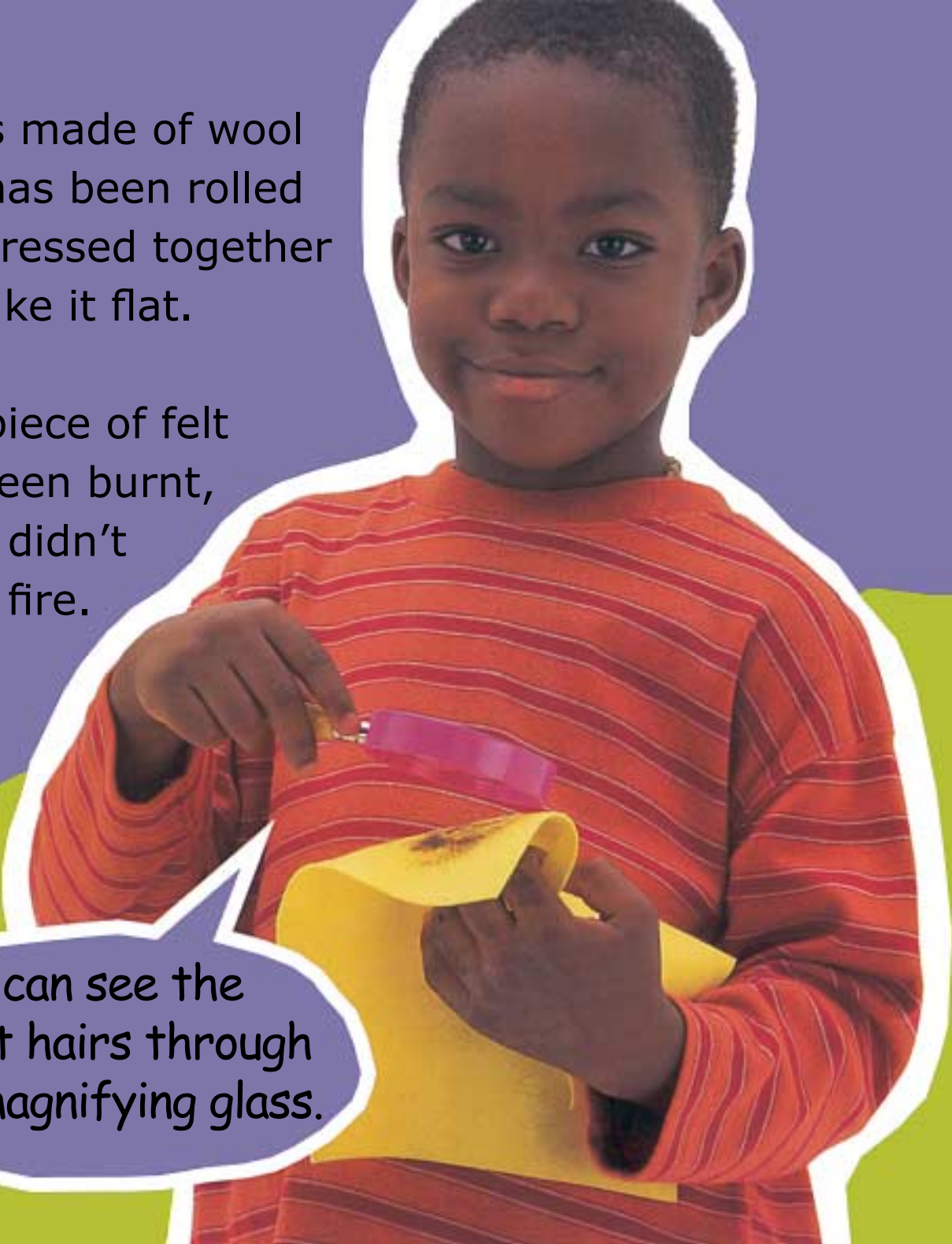
My gloves
are clean and
dry now.



They're
much lighter.

Felt is made of wool
that has been rolled
and pressed together
to make it flat.

This piece of felt
has been burnt,
but it didn't
catch fire.



I can see the
burnt hairs through
the magnifying glass.

Firefighters' uniforms used to contain a special felt.



The felt
helped protect
firefighters from
the flames.

What shall we do with these
old jumpers? The wool is still
as good as new.



A photograph of two children, a girl on the left and a boy on the right, sitting and unpicking wool from knitted items. The girl is wearing a yellow shirt and blue overalls, and the boy is wearing an orange and red striped shirt. They are both holding up pieces of knitted fabric, showing the internal structure of the wool. The background is white, and the entire image is framed by a thick green border.

Let's unpick the
wool so that we can
use it again.

My gran
can knit me a new
pair of socks!

Notes for parents and teachers

The aim of the *Science Explorers* series is to introduce children to ways of observing and classifying materials, so that they can discover the various properties which make them suitable for a range of uses. By talking about what they already know about materials from their everyday use of different objects, the children will gain confidence in making predictions about how a material will behave in different circumstances. Through their explorations, the children will be able to try out their ideas in a fair test.



pp 2–3

Wool was first used for clothing thousands of years ago. In 4,000 BC people began to make cloth from wool by matting the wool together and spinning it into thread. The Romans made togas out of fine wool. By the beginning of the fourteenth century, wool was an important source of wealth in Britain.

Wool is chiefly used to make clothing, but ask the children to look for other things that can be made of wool, for example, carpets, paint rollers, slippers, tennis balls and curtains.

pp 4–5

Wool is a fibre that comes from the fleece of sheep and other animals including goats (mohair and cashmere), rabbits (angora) and llama (alpaca). The fibres grow like hair from roots in the skin and have a natural waviness or crimp. The hairs are covered with tiny scales and with a natural greasy coating, called lanolin. Show the children a picture of a magnified wool fibre so that they can see the scaly coating. Make sure the children always wear protective gloves when handling raw wool.

pp 6–7

A sheep's coat, the fleece, is shorn in spring or summer. The fleeces are washed to remove seeds, mud, dung and lanolin. Then the wool is dried and fed through a carding machine, which combs the wool so that all the fibres are pointing in the same direction. This turns the wool into a flat mat which is cut into narrow strips. Spinning machines twist the strips into yarn. The children could try carding some wool using a comb or a hairbrush.

pp 8–9

Wool is highly absorbent, making it easy to dye. Usually it is dyed before being knitted or woven. Yarn can be knitted and woven by hand or by machine. The children could try out some simple knitting or weaving.

pp 10–14

The type and quality of wool can make it feel very different – some wool feels soft and smooth against the skin, while other types feel itchy and scratchy. The children could compare garments made from different types of wool, for example, a lambswool sweater and an Arran sweater. Wool is stretchy and springy because of its natural crimp.

p 15

Pockets of air trapped between the wool fibres stop the heat escaping from our bodies. By looking at a knitted garment through a magnifying glass, the children will be able to see the individual fibres, helping them to understand how wool insulates.

pp 16–19

Give the children a selection of woollen clothes and other garments made from artificial fibres. See if they can work out which are made from wool and which are not. Do the clothes feel and smell different? The children could test them for stretchiness, strength and absorbency. Wool is water resistant and will hold a lot of moisture before feeling damp, which is why wool coats help sheep to stay dry in the rain. Wool needs to be washed with care because the overlapping scales can cause wool to shrink and mat together if washed in hot soapy water.

pp 20–21

Felt is matted wool. Until the early 1990s, wool was used in firefighters' uniforms because it does not continue to burn when removed from a flame. Can the children think of any other people who would need to wear similar protective clothing for their work?

pp 22–23

Wool is very durable and hard-wearing. Today there are many artificial alternatives to wool, including acrylic, nylon and polyester. Sometimes these are blended with wool. Artificial fibres are cheaper to make, but they lack many of wool's special qualities. The children could look at the labels of a selection of clothes and make a list of the different materials.

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